Maintenance of Long-Term Weight Loss

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A key problem in the area of weight control is the maintenance of weight loss. Behavioral treatment programs are able to consistently produce weight losses of 7 – 10% of initial body weight at the end of 6 – 12 months of treatment. However, even with ongoing contact, clients often regain the weight, a finding documented by the Diabetes Prevention Program. [1]

What makes weight loss maintenance so difficult? Physiological changes which occur during weight loss can promote weight regain; e.g., decreases in metabolic rate, increases in catecholamine excretion and thyroid function, increase in ghrelin, and increases in lipoprotein lipase activity. Psychological and behavior changes are also related to weight regain. People may become bored on restricted diets and more responsive to palatable foods and social cues that pressure them to eat more and exercise less. Finally, dieters' motivation may decrease after an initial weight loss; clothes fit better, health may have improved, and the psychological effort or "costs" of adhering to a weight loss regimen may come to outweigh the benefits.

Two approaches have been used to better understand the behavioral factors associated with weight loss maintenance and regain. One approach is to study those who have been successful at long-term weight loss maintenance. The other approach is to conduct randomized trials evaluating specific approaches to improve long-term weight loss. Both of these approaches are discussed below.

The National Weight Control Registry

In 1994 Drs. Rena Wing and James Hill founded the **National Weight Control Registry** (**NWCR**) to identify a large sample of individuals who were successful at long-term maintenance of a substantial weight loss (i.e. "successful weight losers"). The NWCR recruits members who are 18 years-old or older, and have maintained a weight loss of at least 30 lbs. for at least one year. Registry members are assessed yearly via questionnaires that tap both physiological and psychological constructs, including eating habits, activity patterns, and weight control strategies. The NWCR has more than 6,000 participants enrolled to date.

The NWCR members are predominately female (77%), college educated (82%), Caucasian (95%), and married (64%). Before losing weight, the average NWCR member had a **Body Mass Index** (**BMI**) of 36.7, which is in the obese range (a BMI of greater than 25 is considered overweight, greater than 30 is considered obese). Upon entry to the NWCR, the average member had lost 74.0 lbs., which reduced her BMI to 25.2, near the normal weight range. [2] Although the registry is relatively homogeneous in terms of gender, ethnicity, and socioeconomic status, efforts are being made to diversify the sample in the hope that future reports will be able to explore differences among these subgroups.

Weight Loss Strategies

NWCR members share a history of successful weight loss, which was most frequently achieved by using a combination of dietary change and increases in physical activity (89% of the sample). Far fewer changed only their diet (10%) or their activity level (1%). Less common strategies included the use of liquid meal replacements (13.8%; e.g., SlimFast), weight loss medications (6.2%), and surgery (2.4%). While diet and physical activity were clearly the most common strategies, the specific techniques used were highly variable. [3]

Within the general category of dietary change, the three most common weight loss techniques included limiting intake of foods associated with weight gain (e.g., sugary and fatty foods like deserts), decreasing the quantities of all foods eaten, and counting calories. These strategies were practiced by registry members on their own (44.6%), as well as in formal programs (55.4%) such as Weight Watchers, Overeaters Anonymous, and individual sessions with a psychologist or registered dietician.[4]

Registry members who used physical activity as part of their weight loss effort almost always exercised at home (92%). A sizable minority exercised regularly with a friend (40.3%) or in a group (31.3%). Most members engaged in one or two types of activity, with walking and aerobic dancing more common in women, and competitive sports and weightlifting more common in men.[4]

Successful weight loss is associated with a variety of benefits among registry members.[4] Almost all participants (95.3%) show increases in quality of life, which is a general measure of well-being that incorporates physical and psychological aspects. Weight loss tends to improve energy and mobility for most registry members (92.4%), making physical activity a more likely possibility. Mood also improves for the majority of weight losers, with 91.4% reporting decreases in depressive symptoms. Of course, the physiological benefits of weight loss are well documented, with decreases in hypertension, type II diabetes, heart disease, and cancer.

Weight Maintenance Strategies

Despite the variable methods used to lose weight, most NWCR members used the same few strategies to maintain their weight loss. These strategies fall into three categories: eating habits, self-monitoring, and physical activity.

The eating habits of successful weight losers are characterized by a low daily caloric intake of about 1,385 k/cal per day and a low percentage (24%) of calories from fat.[5] These values may reflect the fact that the majority (55%) of registry members are still trying to lose weight. Additionally, the underreporting of caloric intake is well documented, especially in overweight individuals.[6] Furthermore, those who recently entered the registry report somewhat higher dietary fat intake (29%), probably reflecting the popularity of low carbohydrate diets.[7]

Also, registry members try to eat regularly and avoid situations that encourage overeating. The average registry member eats several times throughout the day (M = 4.87).[5] For most members (78%), one of these meals is breakfast.[8] Most meals are prepared at home. In contrast to the majority of Americans, registry members rarely eat fast food (on average less than one meal per week (M

= .74)).[5] In total, Registry members eat outside of the home an average of only 3 times per week. Furthermore, the members who are most successful at maintaining their weight loss tend to have very little variety in their diet, and do not "splurge" on high calorie foods on holidays or weekends.[9]

Self-monitoring is another important aspect of weight maintenance efforts. Over 75% of registry members weigh themselves more than once per week, and 50% count calories and/or fat grams.[5] Registry members also score highly on the Cognitive Restraint subscale of the Eating Inventory, which is related to the amount of mental effort that is spent on weight control.[3]

Finally, registry members are notable for their physical activity.[3] Walking is the most common exercise (76.6% of participants), followed by weight lifting (20.3%) and cycling (20.6%). The average successful weight loser reports engaging in a level of physical activity that is equivalent to about one hour of moderate intensity physical activity, such as brisk walking, per day. This is considerably more than the minimum recommendations proposed by the Surgeon General's report. The time spent on physical activity likely comes at the expense of more sedentary activities. The average registry member tends to watch only 6 to 10 hours of television per week,[10] in stark contrast to the average American adult, who spends an average of 28 hours per week watching TV.[11]

Predictors of Weight Maintenance

The average registry member devotes a substantial amount of time and energy to behaviors aimed at weight control. Fortunately, the most successful registry members report that it becomes easier to maintain a weight loss over time.[12] Nevertheless, weight regain sometimes occurs. This failure to maintain weight loss is most often associated with a lapse in the weight control strategies described above.

At one year follow-up, the majority of members either maintained their weight loss (59%) or lost additional weight (6%). However, 35% gained 5 lbs. or more, with an average weight gain of 15.5 lbs..[2] Compared to those who maintain their weight loss, members who regained weight tended to have a shorter duration of weight loss maintenance (i.e., less than 2 years), less dietary consistency, more fast food consumption,[2] more TV viewing,[10] and less frequent breakfast consumption.[8] Weight regainers are also characterized by higher levels of depressive symptoms and dis-inhibited eating, which is a failure to maintain control over eating.[2]

These findings demonstrate that successful weight loss and weight maintenance is possible, but requires sustained effort, especially in the early stage of weight maintenance, when regain is most likely.

Can we teach these strategies?

Can we teach these strategies to others who have recently lost weight and help them with their weight loss maintenance? To address this question, Wing and colleagues conducted a study called STOP Regain.[13] A total of 314 participants who had lost at least 10% of their body weight within the past 2 years were recruited. Recent weight losers were selected because these individuals are at greatest risk of regain. These participants had lost weight in a variety of ways including through commercial programs, liquid formula diets, or on their own. On average, these participants were 51 years of age, had lost a mean of 19.3 kg or almost 20% of their body weight within the past 2 years, and currently had a BMI of approximately 29.

Participants were randomly assigned to one of three groups: a control group, a group that received a face-to-face intervention, or a group that received an Internet intervention. The two interventions were comparable in content and frequency of contact. Both involved 4 weekly meetings followed by monthly meetings for a total of 18 months of follow-up. The intervention was based on a self-regulation model, in which participants were taught to weigh themselves daily and to use the information from the scale to know when changes in diet and physical activity behaviors were needed. The program helped them learn about the eating habits of the NWCR members, and emphasized, for example, the importance of eating breakfast, the need to be vigilant about dietary choices, and the day-to-day consistency observed in NWCR members. In addition, participants were taught to gradually increase their level of physical activity, so that they were eventually doing 60-90 minutes a day of moderate intensity activity, again similar to registry members.

The STOP Regain program was effective in preventing weight regain, especially when it was offered in the face-to-face format. Over the 18 month trial, participants in the control group regained 4.9 kg on average, and the Internet participants regained 4.7 kg. In contrast, the face-to-face group regained only 2.5 kg, significantly less than either of the other groups. The percent of participants who regained 5 lbs or more over the 18 months was significantly higher in the control group than in the face-to-face or Internet groups (72.4% vs 45.7% and 54.8% respectively). The greater benefit of personal contact compared to Internet approaches was confirmed in another maintenance trail.[14]

Of particular note was the STOP Regain finding that self-weighing frequency increased in the Internet and face-to-face groups, while it remained unchanged in the control. Moreover, those who weighed daily in the Internet and face-to-face groups had less risk of regaining weight than those who weighed less frequently. The same effect was not observed in the control group. This finding suggests that it was not the frequency of weighing per se that affected weight regain, but rather weighing frequently and using the information from the scale to self-regulate behavior.

Key behaviors associated with weight loss maintenance

Both STOP Regain and other studies of weight loss maintenance have identified a cluster of behaviors and psychological variables that are associated with improved long-term maintenance of weight loss. In particular, high levels of physical activity have consistently been shown to lead to improved long-term outcomes. Jakicic et al.[15] demonstrated that women who maintain activity levels of over 200 minutes per week are best able to maintain their weight losses. Moreover, high levels of dietary restraint are associated with better maintenance of weight loss.[16] Restraint, as measured by the Eating Inventory,[17] includes strategies such as deliberately taking small helpings, avoiding certain foods, and counting calories; these are all key behav-

iors accented in behavioral weight loss programs. In contrast, those who report higher levels of depressive symptomatology or disinhibition (difficulty controlling overeating) have in some studies been shown to be more likely to regain weight. Efforts are needed to develop ways to modify these psychological variables.

Efforts at the Weight Control and Diabetes Research Center

The National Weight Control Registry has provided important information about the behaviors of successful weight loss maintainers and STOP Regain has shown that teaching these strategies can help to improve weight loss maintenance.

Efforts are underway to increase the number of ethnic minority members in the registry, to better understand the strategies used by African American and Hispanics who are successful weight loss maintainers. In addition, a new Teenage National Weight Control Registry is being developed. Those who are age 14-20 and have lost at least 20 pounds are encouraged to join. This registry will provide important information about what motivates young adults to lose weight and what role parents and friends can play in these efforts.

The Center is also studying strategies that may help individuals who have lost weight maintain their success. Since staying in close contact with participants appears important for weight loss maintenance, we are investigating ways that we can maintain on-going contact using new technological approaches, rather than requiring face-to-face visits. We are also studying ways to motivate individuals to not only initiate behavior change, but also to stay with it long-term.

Conclusions

Maintenance of weight loss is crucial to the control of weight. The WCDRC is addressing this problem by studying those who have succeeded at weight loss maintenance and developing programs that teach maintenance strategies to those who have recently lost weight.

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The authors have no financial interests to disclose.

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